

Public Right of Way Lighting

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Description

- Public Right of Way LPD model standard.
- LPD maximums will vary by four lighting zones and by roadway classification (expressway, major, collector, local and freeway).



Design Criteria

- Design Criteria IESNA RP-8-00 “Roadway Lighting”.
- Lighting design criteria is selected for the four lighting zones for each roadway classification:
 - LZ1 (low pedestrian conflict).
 - LZ2 (low pedestrian conflict).
 - LZ3 (medium pedestrian conflict).
 - LZ4 (high pedestrian conflict).



Design Criteria Table

Lighting Zone	Conflict	Roadway Classification	Average Horizontal Illuminance	Uniformity of Illuminance Average/Minimum Ratio
1	Low Conflict	Local	0.3	6:1
2	Low Conflict	Expressway	0.9	3:1
		Major	0.9	3:1
		Collector	0.6	4:1
		Local	0.4	6:1
3	Medium Conflict	Expressway	1.2	3:1
		Major	1.3	3:1
		Collector	0.9	4:1
		Local	0.4	6:1
4	High Conflict	Expressway	1.4	3:1
		Major	1.7	3:1
		Collector	1.2	4:1
		Local	0.9	6:1
2-4		Freeway Class A	0.9	3:1
2-4		Freeway Class B	0.6	3:1



Lighting Equipment used in models

Lamps and ballasts:

- Metal Halide lamps, horizontal burn position.
- Mean lumens.
- CWA ballasts.

Luminaires:

- IESNA type III, full cut-off.
- Light Loss Factor of 0.70.
- Luminaire located at edge of traveled way.



Lighting Models

- Based on typical streetscape cross-sections.
- The lighting calculations are performed across the entire traveled way for each particular cross-section.
- Poles are located on a single side for narrow roadways; in a staggered arrangement for medium width roadways; and paired or opposite sides for wider roadways.



Lighting Models

Lighting Zone	Roadway Classification	Lamp Type	Pole Height	Pole Spacing / Layout
1	Local – low conflict	150w MH	25	150 Single Side
	Expressway – low conflict	400w MH	40	150 Single Side
2	Major – low conflict	250w MH	30	100 Paired
	Collector – low conflict	250w MH	30	210 Staggered
	Local – low conflict	150w MH	25	150 Single Side
	Expressway – medium conflict	400w MH	50	90 Paired
3	Major – medium conflict	400w MH	40	130 Paired
	Collector – medium conflict	250w MH	30	150 Staggered
	Local – medium conflict	150w MH	25	220 Staggered
	Expressway – high conflict	1000w MH	70	250 Paired
4	Major – high conflict	(2) 400w MH	40	160 Paired
	Collector – high conflict	400w MH	35	150 Paired
	Local – high conflict	250w MH	25	220 Staggered
2-4	Freeway Class A	(4) 400w MH	70	270 Median
2-4	Freeway Class B	250w MH	40	110 Paired



Calculations

- Software: Lighting Analysts AGI-32 v1.5 software.
- Initial design is based on “common” pole heights, lamp wattages and pole spacing.
- Initial design criteria to meet are average illuminance (adjust wattage and spacing).
- Check uniformity and adjust spacing if not met.



Calculation Results

Lighting Zone	Roadway Classification	LPD Actual	Average Horizontal Illuminance (fc)		Horizontal Illuminance Avg/Min Ratio		Veiling Luminance Max/Avg Ratio
			Criteria	Calculated	Criteria	Calculated	
1	Local – Low Conflict	0.036	0.3	0.5	6:1	5.4	0.4
	Expressway – Low Conflict	0.041	0.9	0.9	3:1	2.9	0.3
2	Major – Low Conflict	0.069	0.9	0.9	3:1	2.0	0.3
	Collector – Low Conflict	0.067	0.6	0.6	4:1	3.8	0.4
	Local – Low Conflict	0.036	0.4	0.5	6:1	5.4	0.4
	Expressway – Medium Conflict	0.079	1.2	1.2	3:1	1.9	0.3
3	Major – Medium Conflict	0.084	1.3	1.4	3:1	3.0	0.3
	Collector – Medium Conflict	0.074	0.9	0.9	4:1	3.2	0.4
	Local – Medium Conflict	0.049	0.7	0.7	6:1	3.4	0.4
	Expressway – High Conflict	0.054	1.4	1.5	3:1	3.0	0.3
4	Major – High Conflict	0.103	1.7	1.8	3:1	3.0	0.3
	Collector – High Conflict	0.077	1.2	1.3	4:1	3.7	0.4
	Local – High Conflict	0.083	0.9	0.9	6:1	3.4	0.4
2-4	Freeway Class A	0.043	0.9	0.9	3:1	2.5	0.3
2-4	Freeway Class B	0.056	0.6	0.6	3:1	2.8	0.3



Recommendations

- This measure is proposed as a model standard to be voluntarily adopted by CALTRANS and local California jurisdictions.
- Include requirements for lighting controls, maximum lighting power and shielding of luminaires.
- Requirements are expressed by lighting zones.



Lighting Allowed Power

Road Classification	LZ1	LZ2	LZ3	LZ4
Expressway	0.036	0.041	0.079	0.054
Major	0.036	0.069	0.084	0.103
Collector	0.036	0.067	0.074	0.077
Local	0.036	0.036	0.049	0.083
Freeway Class A	n. a.	0.043	0.043	0.043
Freeway Class B	n. a.	0.056	0.056	0.056



Controls and Shielding

- Photosensors turn off lighting during daylight hours.
- All luminaires greater than 100 watts to be IESNA cutoff type.

